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DENTAL PASTE MATERIAL

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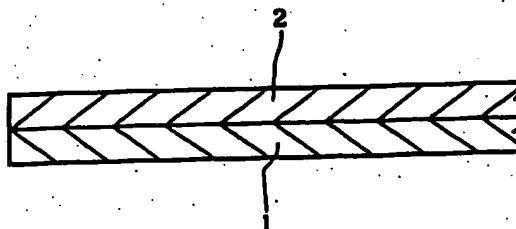
Abstract

Means to solve

A dental paste material characterized by the fact that beautifying-whitening components for teeth are blended in a paste layer to be pasted on the tooth surface.

Effects

By pasting a dental paste material of the present invention on teeth, stains due to incrustations from drinking coffee, black tea, green tea, etc., and smoking can be removed.



Claims

1. A dental paste material characterized by the fact that beautifying-whitening components are blended in a paste layer to be pasted on the tooth surface.

2. The dental paste material described in Claim 1 in which the beautifying-whitening component is kojic acid, a kojic acid salt, or a kojic acid derivative.

Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention relates to a dental paste material appropriate for the whitening of teeth. More specifically, it relates to a dental paste material for the removal or adherence prevention of teeth-discoloring materials that adhere from drinking or eating foods, from smoking, or from the generation of bacteria by dissolution, bleaching, etc. with a beautifying-whitening agent.

[0002]

Prior art and the problems to be solved by the invention

Conventionally, the removal of colored substances adhered on teeth has been carried out physically by using a tooth

4

polishing agent or a toothbrush, or by polishing with polishing components contained in the tooth polishing agent. However, there have been cases in which it is difficult to remove completely because of the spaces between teeth, depressions of biting portions or other portions that are difficult to access with a toothbrush, and the good or bad technique of the user, etc. These colored substances can be removed by dental cleaning by dentists, dental hygienists or other specialists by going to dental clinics. However, it is necessary to go to the clinic once every few months and this is troublesome.

[0003]

The present invention has the objective of providing a dental paste material capable of removing colored substances adhered on teeth by simply pasting it on teeth in order to improve the things mentioned previously.

[0004]

Means to solve the problems and the application of this invention

As a result of carrying out zealous investigations to achieve the objective mentioned previously, the present inventors have discovered that there is an excellent effect in the whitening of teeth by the fact that the teeth are whitened by the removal of colored materials adhered on the teeth or the prevention of the adherence of colored materials on the teeth by dissolution, bleaching or other actions of a beautifying-

whitening component with respect to the colored materials by containing the teeth beautifying-whitening component in a paste layer to be pasted and adhered to the teeth, and the fact that, in this case, kojic acids (kojic acid, kojic acid salt, and kojic acid derivatives) are effective as the teeth beautifying-whitening components kojic acids, have a high effectiveness in the dissolution and softening of adhered materials (tea incrustations, tobacco stains and so on), and kojic acids are contained in the paste layer. The present invention has been accomplished.

[0005]

To further explain the present invention in more detail in the following, the dental paste material of the present invention is a material obtained by blending a beautifying-whitening component for teeth in a paste layer to be pasted on teeth.

[0006]

In this case, for the dental paste material of the present invention, as shown in Figure 1, a paste layer (2) is formed on a support layer (1). During use, the paste layer (2) is pasted on the tooth surface. It is preferable this to be in an adhered state. However, of course, it is not restricted to this.

[0007]

In this case, the support mentioned previously has a water-insoluble polymeric substance as the major component. It can be formed into a material with the blending of a plasticizer. Here, as the water-insoluble polymeric substances, ethylcellulose, cellulose acetate, methacrylic acid-methacrylic acid chloride trimethylammonium copolymer, polyvinyl acetal-dimethylamino acetate, methacrylic acid dimethylaminoethyl-methacrylic acid copolymer, cellulose acetate-dibutylhydroxypropyl ether, carboxymethylethylcellulose, acetic acid phthalic acid cellulose, hydroxypropylmethylcellulose phthalate, etc., can be used. Furthermore, as plasticizers, ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, polyethylene glycol, glycerin, triacetylene, castor oil and so on can be used.

[0008]

In the case of the formation of the support layer mentioned previously, it is possible to adopt a method, for example, in which the previously mentioned water-insoluble polymeric substance and the plasticizer are dissolved in an organic solvent, this is spread on a strip made of plastic, metal or the like, the organic solvent is removed, and it is dried.

[0009]

The thickness of the support layer is 50-500  $\mu\text{m}$ . In particular, 200-300  $\mu\text{m}$  is preferred from the aspect of use characteristics, etc.

[0010]

On the other hand, it is preferable for the paste layer to have a water-soluble polymeric substance as the major component. A plasticizer and a beautifying-whitening component may be blended. Here, as the water-soluble polymeric substances, polyvinyl alcohol, polyvinylpyrrolidone, carageenan, locust bean gum, guar gum, hydroxyethylcellulose, xanthan gum, tragacanth gum, starch, succinoglucan, etc., can be used. Furthermore, as the plasticizers, the same ones mentioned previously can be mentioned. As the beautifying-whitening components, ascorbic acid, isoascorbic acid, urea peroxide, etc. can be mentioned. In particular, kojic acid, sodium, potassium, and other alkali metal salts of kojic acid, kojic acid salts of calcium, magnesium, and other alkaline-earth metals, carboxylic acid esters, phosphoric acid esters, etc., of kojic acid, and other kojic acid derivatives can be used appropriately. In this case, it is preferable for the beautifying-whitening component to be 0.05-4% (wt%, the same hereafter), desirably 0.1-4%, especially 0.5-2%, in the dried paste layer.

[0011]

The formation method of the paste layer can also be selected appropriately. It is possible to adopt a method in which the water-soluble polymeric substance, the plasticizer and the beautifying-whitening component mentioned previously are dissolved or dispersed in water, this is poured on the support layer mentioned previously, and dried. However, in this case, the paste layer is formed in a porous state. Since it is desirable for the kojic acids or other beautifying-whitening components to effectively act on the tooth surface when pasting on the teeth, vacuum freeze-drying is preferred.

[0012]

The thickness of the paste layer is 200-1000  $\mu\text{m}$ . In particular, 400-800  $\mu\text{m}$  is preferred from the aspect of use characteristics, etc. Furthermore, it is preferable for the paste layer to have a pH of 4.5-9, especially 6-8, such as the moistened state by saliva or the like in the mouth. If the pH is too low, use characteristics will be poor. If the pH is too high, there may be cases in which the effectiveness will decrease.

[0013]

The dental paste material of the present invention can be used by, for example, wetting the paste layer with water then pasting and adhering it on teeth. By the action of the beautifying-whitening component in it, the colored material

adhered on the teeth can be removed and the teeth can be whitened.

[0014]

#### Effects

By pasting the dental paste material of the present invention on the teeth, stains due to incrustations from drinking coffee, black tea, green tea, etc., and smoking can be removed.

[0015]

#### Application examples

The present invention will be explained specifically by giving application examples and comparative examples in the following. However, the present invention is not to be restricted to the following application examples. In the following examples, the support layer solution was spread on a plastic strip, and vacuum-dried to form a support layer with a thickness of 250  $\mu\text{m}$ . Afterwards, the paste layer solution was spread on top of it. Then, after preliminary freezing, it was subjected to freeze-drying to form a paste layer with a thickness of 700  $\mu\text{m}$  to manufacture each of the dental paste materials. Furthermore, in the following examples, % is in wt%.

[0016]

Application Example 1

## 1) Paste layer

Polyvinyl alcohol	10.0(%)
Propylene glycol	3.1
Kojic acid	0.5
Methyl p-oxybenzoic acid	Trace
Water	86.6

## 2) Support layer

Ethylcellulose	10.0
Castor oil	6.0
Edible dye	4.0
Ethanol	80.0

[0017]

Application Example 2

## 1) Paste layer

Hydroxyethylcellulose	10.0(%)
Polyethylene glycol	3.1
Kojic acid	1.0
Methyl p-oxybenzoic acid	Trace
Water	86.6

## 2) Support layer

Polyvinyl acetal-dimethylamino acetate	10.0
Castor oil	6.0
Edible dye	4.0
Ethanol	80.0

[0018]

Application Example 3

## 1) Paste layer

Hydroxypropylcellulose	10.0 (%)
Glycerin	3.1
Kojic acid	0.1
Methyl p-oxybenzoic acid	Trace
Water	86.6

## 2) Support layer

Ethylcellulose	10.0
Castor oil	6.0
Edible dye	4.0
Ethanol	80.0

[0019]

Comparative Example 1

## 1) Paste layer

Polyvinyl alcohol	10.0 (%)
Propylene glycol	3.1
Methyl p-oxybenzoic acid	Trace
Water	86.9

## 2) Support layer

Ethylcellulose	10.0
Castor oil	6.0
Edible dye	4.0
Ethanol	80.0

[0020]

Next, the evaluations using the previously mentioned dental paste materials with tannin stain chips were carried out by the following methods:

## ① Tannin stain chip preparation

White acrylic chips (color difference E 1), subjected to sand blasting were repeatedly immersed for 1 h each in the sequence of 0.5% albumin aqueous solution → 3% Japanese tea +1% coffee +1% black tea extract aqueous solution → 0.57% citric

acid iron ammonium salt aqueous solution. This operation was continued for two weeks. They were removed from the stain solution. The surface of the acrylic chips were brushed lightly in running water to remove the weakly adhered stains. They were then wind-dried to obtain the sample chips.

② Method for the evaluation of the tannin stain removing power

The color difference (E2) of the sample chips with adhered tannin stains was measured. The materials obtained by wetting the paste layer of the pasting material mentioned previously with distilled water was pasted on the chip surface. The color difference (E3) of the sample chips after standing for 1 h in an atmosphere with a humidity of 100% was measured.

**[0021]**

The removal efficiency was calculated from the following equation. The removing power was evaluated according to the criteria shown in the following. The results are shown in Table I.

$$\text{Removal efficiency (\%)} = [(E3 - E2) / (E1 - E2)] \times 100$$

(where  $E_1$  is the color difference of the chips before the adherence of the tannin stains)

Tannin dirt removing power more than 918 - 0

70-908 - Δ

less than 69% - X

[0022]

Table I

		評價結果
2 實施例	1	○
	2	○
	3	△
3 比較例	1	×

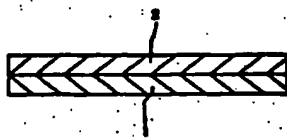
Key: 1 Evaluation results  
 2 Application Example  
 3 Comparative Example

#### Brief description of the figure

Figure 1 is a cross-sectional diagram showing an application example of the present invention.

#### Explanation of symbols

1 support layer  
 2 paste layer



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